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ABSTRACT

This study investigated preschool children's understanding of the words "know" and "guess." Subjects for the study were 48 male and female preschool children ranging in age from 3.6 to 6.6 years. The children were divided into three age groups representing one year intervals. The task for the study involved a "guessing" game in which a colored shape was hidden under one of three small boxes. To determine whether the children could differentially use the words "know" and "guess", their state of knowledge was manipulated by having them either watch or close their eyes while the experimenter hid the toy. In addition, in order to determine if information about the correctness of their choice might influence their judgments, these judgments were elicited both before and after they were informed about the correctness of their choice. Results indicated a positive linear relationship between age level and correct response. The youngest children tended to respond randomly while the oldest responded in an adult pattern. The middle age range children were evenly distributed between those who based their answers on the experimenter's indication of the correctness of their response and those who responded according to whether they had seen the toy being hidden. The results were discussed in terms of: (1) a developmental model for the acquisition of words for non-perceivable events and (2) the relationship of this model to the theoretical conception of the transition from preoperational to concrete operational thought. (Author/BD)

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Children's Understanding of the Words

Know and Guess

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For the past several years, one of the more active research areas in the study of language development has been that of developmental changes in the acquisition of word meaning. A variety of semantic domains have been studied, including quantitative adjectives, spatial prepositions, and dimensional adjectives. Through these studies, the nature of the semantic knowledge possessed by preschoolers at different points in the acquisition of these words has been characterized.

We think that two points are of particular importance to the description and explanation of these developmental sequences. The first is that the acquisition process is not of an all-or-none sort. Rather, children begin to use words before they have acquired the full set of features which characterize the adult meaning of the word. (Clark, 1973).

The second point, made by Clark (1974), Kuczaj (1975) and others, is that the acquisition of semantic knowledge is a comprehension-based process. Specifically, it has been suggested that children use their limited linguistic and cognitive capabilities to interpret the linguistic, behavioral and non-verbal contexts in which the words occur. On the basis of these interpretations, children assign semantic features to words.

Of fundamental importance to this second point is the notion that the interpretations the child makes of various words are a function of his cognitive capabilities, and are limited by his level of cognitive development. Supportive of this idea are studies of early language development which indicate that the first words children learn are those referring to interesting objects and to the actions in which these objects participate. It is the comprehension of these

objects and events which constitute a major portion of sensori-motor activity.

Similarly, the majority of meaning acquisition studies carried out with young preschool children have used words which encode information at a pre-operational level. Words such as "in," "on," "under," "more," "less," "big," and "small" encode specific physical and spatial relationships between objects and events which exist in the external world. The important point is that all of these relationships can be characterized in terms of invariant features which are directly perceivable--and it is just these aspects of the world which are the focus of the young preschooler's most advanced cognitive activities.

But what of words that encode internal, covert, psychological events that are not perceived in the same manner as physical events, and that are characterized by sets of features that cannot be directly perceived? Do children use these words in some predictable, rule-governed fashion before they have acquired the full set of features characteristic of adult usage? If so, what meaning do they assign the words? Finally, does it appear that the child's understanding of these words, like those mentioned above, is limited by his level of cognitive development? If so, then we would expect children to acquire an adult understanding of these words only toward the end of the preschool period-- the same time at which they develop an awareness of the internal experiences of themselves and of others.

The purpose of this study was to describe the developmental sequence in the acquisition of the meaning of the words "know" and "guess," words which encode certain classes of internal, psychological processes which are not directly perceivable. On the basis of earlier studies on the development of perspective-taking, (Flavell 1974; Marvin, Greenberg, Mossler 1976) and on the basis of

a number of widely accepted ideas concerning the transition from preoperational to concrete operational thought, we hypothesized the following developmental sequence:

1) a period in which young preschoolers would not comprehend the words in any systematic fashion.
2) a period during which children would comprehend and distinguish between the words on the basis of directly perceivable cues which occur in the behavioral context.
3) a period in which children would comprehend the words and distinguish between them on an adult basis, i.e., on the basis of the psychological process engaged in.

Method

Sample

Subjects consisted of 48 preschool children, ranging from 3;6 to 6;6 years, equally divided into 3 one-year age levels and balanced for sex. The children were obtained from preschools in Charlottesville, Virginia.

Procedure

The children's understanding of the words "know" and "guess" was assessed in the context of a social guessing game the object of which was to determine in which of three small boxes the experimenter had hidden a colored shape. At different points in each hiding-picking sequence the children were asked if they were guessing or if they knew where the shape was hidden.

Children's judgments were elicited in two general contexts, divided into five specific conditions (See Figure 1). In the PAS context, the experimenter hides the shape and tells the child to see if he can pick the box containing the shape. After the child picks, he is asked, "Are you guessing that the shape is in that box, or do

you know that the shape is in that box?" After he responds, the box is then opened and shown to the child. To determine if the child can differentiate "guess" and "know" from one another, this context was presented in two ways: In the +PAS condition, the child watched the experimenter place the shape in the box. In the -PAS condition the child was required to hide his eyes while the shape was hidden.

To specifically test for the pattern based on perceivable cues the child also made judgements in a second context, PSA, consisting of 3 conditions. In this context, the order of show and ask was reversed, i.e., the child was asked if he knew or guessed after he was shown whether or not he had picked correctly. In the +PSA condition, the child watched the experimenter place the shape, picked the box, was shown the contents of the box, and was then asked if he had guessed or had known. In the -PSAC condition, the child hid his eyes while the shape was placed, and his pick was always correct. The -PSAI condition was the same as -PSAC except that the child's pick was always incorrect. The materials were constructed so that the outcome of the pick could be controlled.

Each child was presented with 25 randomly-presented trials: five for each condition. Each trial was scored independently with 5 being the highest possible score for each condition. A response of "know" was correct for +PAS, and +PSA, and a response of "guess" was correct for -PAS, -PSAC and -PSAI. Finally, each child was asked to justify his response during one randomly-selected trial of each condition.

Results

The children's responses were analyzed by means of a three-way (age x sex x condition) multivariate repeated measures analysis of variance. Significant effects were found for age and condition, but not for sex or any interactions.

Inspection of each child's pattern of responses across conditions confirmed the existence of the developmental sequence proposed earlier, and suggested one additional step in that sequence. (Figure 2). The first pattern, which we have labelled "Random," is characterized by children performing at chance level within each of the five conditions. We conclude that these children have not yet assigned any meaning to the words, that is, they do not use them differentially.

The second pattern is labelled "outcome." Here children responded "I know" when they saw the experimenter place the shape, and "I guessed" whenever their pick was wrong. However, they used the words incorrectly in two conditions where they did not watch the experimenter hide the shape. They responded randomly when they hadn't yet been shown if their pick was correct, and responded "I know" when they had been shown that their pick was correct. We conclude that these children can distinguish the words only on the basis of the perceived outcome of their activity.

The third pattern is labelled "outcome-transitional." In this pattern the children responded correctly in all conditions except one--specifically, they would occasionally say that they knew when they did not watch the experimenter hide the shape but picked correctly. We conclude that these children have acquired the adult meaning for the words. However, this acquisition is not yet very stable. As a result, they occasionally revert to interpreting the words in terms of perceived outcome.

The final pattern, labeled "Adult," is characterized by correct performance in all five conditions. We conclude that these children are distinguishing between the words on the basis of the psychological process.

In order to systematically and reliably categorize each child's

pattern of responses into one of these 4 patterns, we developed a mathematical model[1] which took each child's actual response pattern and computed the probability of that pattern conforming to each of the 4 above patterns. This analysis produced the following distribution of patterns by age: (Figure 3) The majority of children between 3:6 to 4:5 responded in a random manner. those between 4:6 to 5:5 responded either according to one of the 2 outcome patterns or in an adult manner, the majority of children between 5:6 to 6:6 responded in an adult manner. A X^2 analysis showed this distribution of Patterns X Age to be highly significant.

The results of the justifications appear to fit these interpretations. Children who responded randomly tended to justify their answers by saying," Because I wanted to," or "I just knew." Children who responded according to outcome used either a similar logic or a logic which was relevant but inappropriate in this case. For example, "I knew because I heard you put it in that box", where in fact this was impossible since sound cues were controlled so that they could not be used. Children in the outcome-transitional pattern vascillated between using the logic characteristic of outcome children, and that of children categorized as adult. Finally, those children who responded according to the adult pattern justified their answers in terms of the logical implications of having seen or not seen the experimenter hide the shape: For example, "I know because I saw you", "I'm guessing because I didn't see you."

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[1]The specific mathematical functions were developed by Ralph G. O'Brien.

These results suggest that it is not until the end of the preschool years that children acquire the adult meanings of the words guess and know. However, younger children do use the words, and use them in a systematic fashion. We believe that a comprehension based theory of meaning acquisition--with this acquisition constrained by the child's level of cognitive functioning--best explains these results. It seems to us that in order to understand the acquisition of the words guess and know, there are 3 things which must be distinguished: first, the initial information state, in this case whether or not the child saw the experimenter hide the object; second, the cognitive process which operates on that information; and third, the decision or outcome of that process.

Our hypothesis is that in order to correctly interpret and use these words, the child must be able to reflect on the initial information state and the psychological process and realize that these features are in some sense independent of the outcome of the process. The important point is that in order to acquire these words the child must have the ability to reflect on his own internal processes.

In the absence of this ability the children rely on the perception of the outcome of the process which is the only remaining invariant. Thus the outcome pattern suggests the lack of this ability; whereas the adult and to a certain extent the transitional pattern suggests its presence.

Finally this application of a comprehension based theory of meaning acquisition to the words guess and know is supported by one of the major distinctions that Piaget makes between concrete operational and preoperational thought (Piaget 1928). The concrete operational child possesses the reversibility necessary to reflect on his own

reasoning process and to reason from initial premise through some operational logic. Not possessing this ability, the preoperational child is limited to a perceptual awareness of the result or outcome of his thinking. We see the adult and outcome patterns obtained in this study as being linguistic examples of this more general distinction.

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FIGURE 1

CONTEXTS IN WHICH COMPREHENSION OF GUESS AND KNOW WAS TESTED

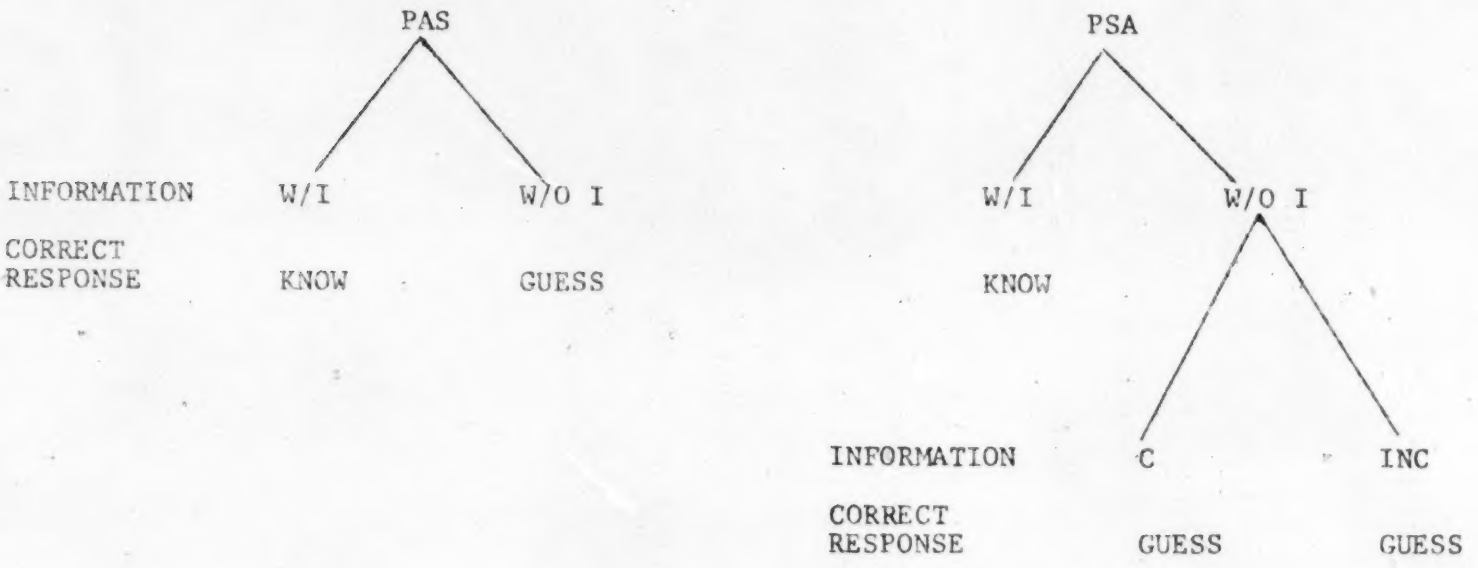

FIGURE 2

DESCRIPTION OF RESPONSES WITHIN CONDITIONS FOR EACH TYPE OF RESPONSE PATTERN

PATTERN	CONDITION				
	+PAS	-PAS	+PSA	-PSAC	-PSAI
RANDOM	G/K	G/K	G/K	G/K	G/K
OUTCOME	K	G/K	K	K	G
OUTCOME/TRANSITIONAL	K	G	K	G(K)	G
ADULT	K	G	K	G	G

G/K = GUESS or KNOW NO PREFERENCE

K = KNOW

G = GUESS

G(K)= GUESS, BUT STILL 1 or 2 KNOW RESPONSES

FIGURE 3

PATTERNS OF COMPREHENSION AS A FUNCTION OF AGE